



Environmental impacts of flood control measures in climate change adaptation strategies

Brudler, Sarah; Arnbjerg-Nielsen, Karsten; Hauschild, Michael Zwicky; Rygaard, Martin

Publication date:
2016

Document Version
Peer reviewed version

[Link back to DTU Orbit](#)

Citation (APA):
Brudler, S., Arnbjerg-Nielsen, K., Hauschild, M. Z., & Rygaard, M. (2016). *Environmental impacts of flood control measures in climate change adaptation strategies*. Abstract from 4th Nordic Conference on Climate Change Adaptation, Bergen, Norway.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Environmental impacts of flood control measures in climate change adaptation strategies

4th Nordic Conference on Climate Change adaption

Authors: Sarah Brudler, Karsten Arnbjerg-Nielsen, Michael Zwicky Hauschild, Martin Rygaard

Because of climatic changes, large investments are needed to keep flood risk at an acceptable level in urban areas. Increasing dimensions of underground sewer systems and retention basins are increasingly supplemented with multi-functional approaches, aimed at managing water locally and/or route it on the surface without harming assets. When evaluating different adaptation approaches, a cost assessment is typically carried out, while environmental impacts usually are not considered. To close this gap, a Life Cycle Assessment (LCA) based method is developed, which allows to quantify environmental impacts of different storm water management strategies. It is tested with two different adaptation strategies for the Nørrebro catchment in Copenhagen, Denmark: A Cloudburst Management Plan (CMP), which uses a multi-functional approach and combines green infrastructure with subsurface pipes, and a Subsurface scenario (SSA), which uses only pipes and underground retention basins. To ensure comparability, flood safety levels for different rain events are defined, which have to be met in both scenarios. The environmental impacts are calculated for eight different categories, including climate change, resource depletion, eutrophication and acidification. The case study shows significantly lower impacts for the multi-functional, green infrastructure CMP, compared to the SSA. Among the installations, those measures which are installed to ensure no water on the surface during rain events with a return period of 10 years and handling small events with a return period of up to 0.2 years cause by far the largest share of the total environmental impacts in both scenarios (up to 96% for the CMP, and up to 84% for the SSA). In contrast, measures aimed at handling extreme events with a return period of up to 100 years only contribute up to 4% of the environmental impacts for the CMP and less than 1% for the SSA. Our method helps explain how the handling of everyday events and extreme rain events affect the environmental sustainability of climate change adaptation and it enables cities to consider the environmental sustainability of climate change adaptation solutions in the planning process.